

CLAIMS

What is claimed is:

- 1 1. A computer-implemented method for managing access to objects by clients in a
 2 distributed file system including a storage server arrangement and a meta-data server,
 3 comprising:
 4 managing leases on the objects at the meta-data server;
 5 transmitting lease expiration data from the clients to the storage server
 6 arrangement along with storage access requests, the lease expiration data indicating a
 7 lease expiration time;
 8 comparing at the storage server arrangement the lease expiration data to data
 9 indicating a current time; and
 10 denying access to the object if the lease expiration time is earlier than a current
 11 time.
- 1 2. The method of claim 1, further comprising transmitting lease requests from the
 2 clients to the meta-data server, each lease request including an object identifier and a
 3 requested lease duration.
- 1 3. The method of claim 2, further comprising for each lease granted, returning data
 2 to a requesting client indicating a time at which the lease began and a duration of the
 3 lease.
- 1 4. The method of claim 3, further comprising computing lease expiration times at
 2 the clients in response to leases granted, wherein the lease expiration data specify the
 3 lease expiration times.
- 1 5. The method of claim 1, further comprising computing lease expiration times at
 2 the meta-data server, and transmitting data indicating the lease expiration times from
 3 the meta-data server to the clients.

- 1 6. A computer-implemented method for managing access to file data in a
2 distributed file system including a storage server arrangement, a meta-data server, and a
3 plurality of clients comprising:
4 submitting a lease request from a client to the meta-data server, the lease request
5 referencing an object in the distributed file system;
6 when the object becomes available for lease, designating the object as leased to
7 the client and transmitting a lease response to the client, the lease response including
8 data that indicate a lease expiration time;
9 transmitting a storage access request referencing the object from the client to the
10 storage server arrangement, the storage access request including data that indicate the
11 lease expiration time; and
12 denying access to the object if the lease expiration time is earlier than a current
13 time.
- 1 7. The method of claim 6, wherein the lease request includes an object identifier
2 and a requested lease duration.
- 1 8. The method of claim 7, wherein the data indicating the lease expiration time
2 describes a time at which the lease began and a duration of the lease.
- 1 9. The method of claim 8, further comprising computing the lease expiration time
2 at the client from the lease response.
- 1 10. The method of claim 6, further comprising computing the lease expiration time
2 at the meta-data server.
- 1 11. An apparatus for managing access to objects by clients in a distributed file
2 system including a storage server arrangement and a meta-data server, comprising:
3 means for managing leases on the objects;
4 means for communicating lease expiration data from the clients to the storage
5 server arrangement along with storage access requests, the lease expiration data
6 indicating a lease expiration time; and

7 means for conditionally providing access to the object at the storage server
8 arrangement if the lease expiration time is later than a current time.

1 12. A system for managing access to objects by clients in a distributed file system,
2 comprising:

3 a meta-data server coupled to the clients, the meta-data server configured and
4 arranged to manage leases to the objects responsive to requests from the clients, and
5 transmit lease expiration data to the clients indicating lease expiration times; and

6 a storage server arrangement coupled to the clients, the storage server
7 arrangement configured and arranged to conditionally provide access to the objects in
8 response to access requests from the clients that include data indicating lease expiration
9 times, wherein access is provided in response to a request if the lease expiration time is
10 earlier than a current time.

1 13. The system of claim 12, wherein the lease request includes an object identifier
2 and a requested lease duration.

1 14. The system of claim 13, wherein the data indicating the lease expiration time
2 describes a time at which the lease began and a duration of the lease.

1 15. The system of claim 14, wherein the meta-data server is further configured to
2 compute lease expiration times.